

Introduction to Relational Database Model

Duration : 1hr

Detailed Syllabus

2.1. Introduction to Relational Data Model

Review of database models

Definition of Relation

Attribute

Tuple

Domain

Instance

Cardinality

Degree

Schema

Constrains

The Relational Model

• Relational Model [Properties]

- Each relation (or table) in a database has a unique name
- An entry at the intersection of each row and column is atomic (or single-valued);
- there can be no multi-valued attributes in a relation
- Each row is unique;
- no two rows in a relation are identical
- Each attribute (or column) within a table has a unique name

The Relational Model

•Properties Cont'd

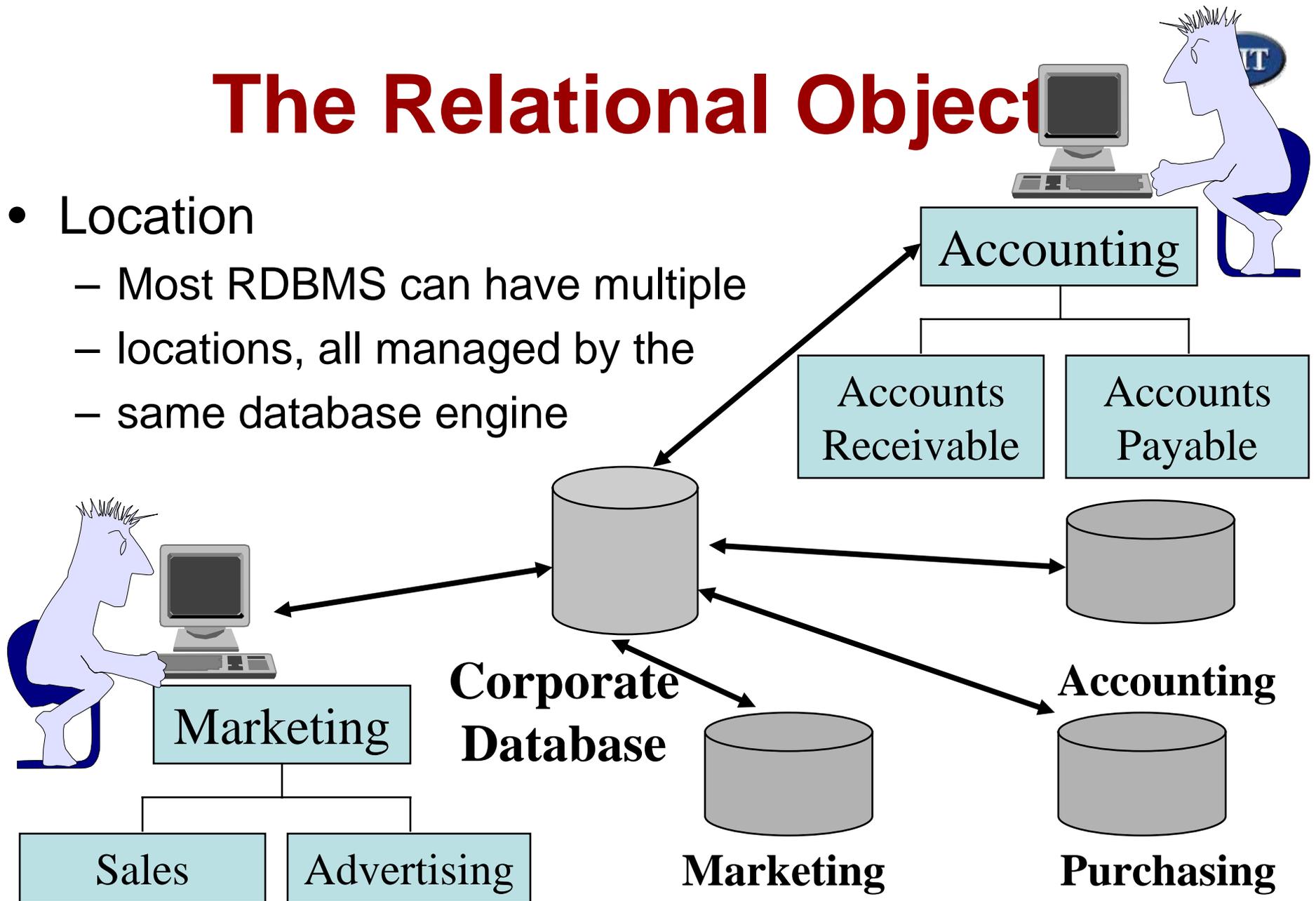
- The sequence of columns (left to right) is insignificant;
- the columns of a relation can be interchanged without changing the meaning or use of the relation
- The sequence of rows (top to bottom) is insignificant;
- rows of a relation may be interchanged or stored in any sequence

The Relational Model...

- **The relational model of data has three major components:**
 - **Relational database objects**
allows to define data structures
 - **Relational operators**
allows manipulation of stored data
 - **Relational integrity constraints**
allows to defines business rules and ensure data integrity

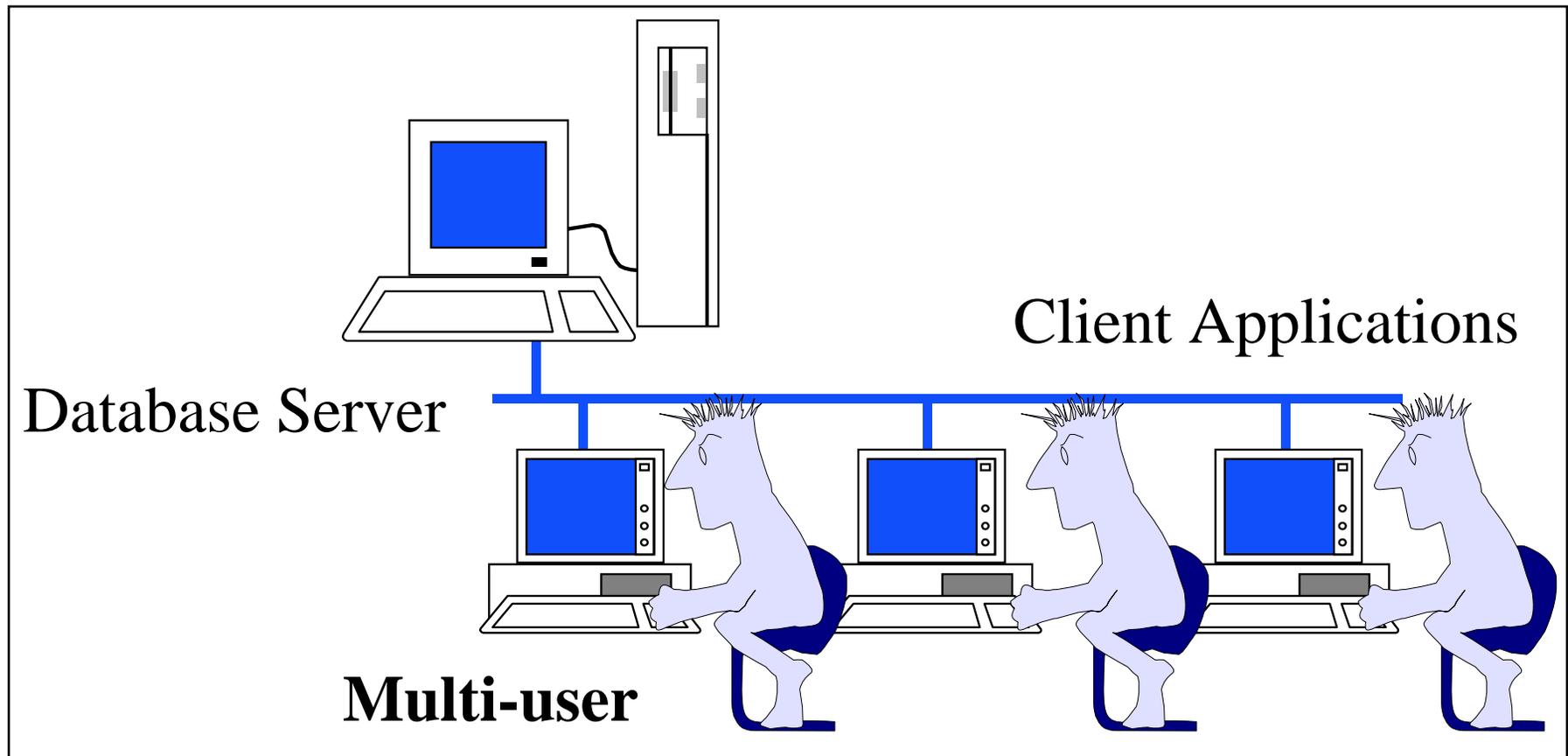
The Relational Object

- Location
 - Most RDBMS can have multiple
 - locations, all managed by the
 - same database engine



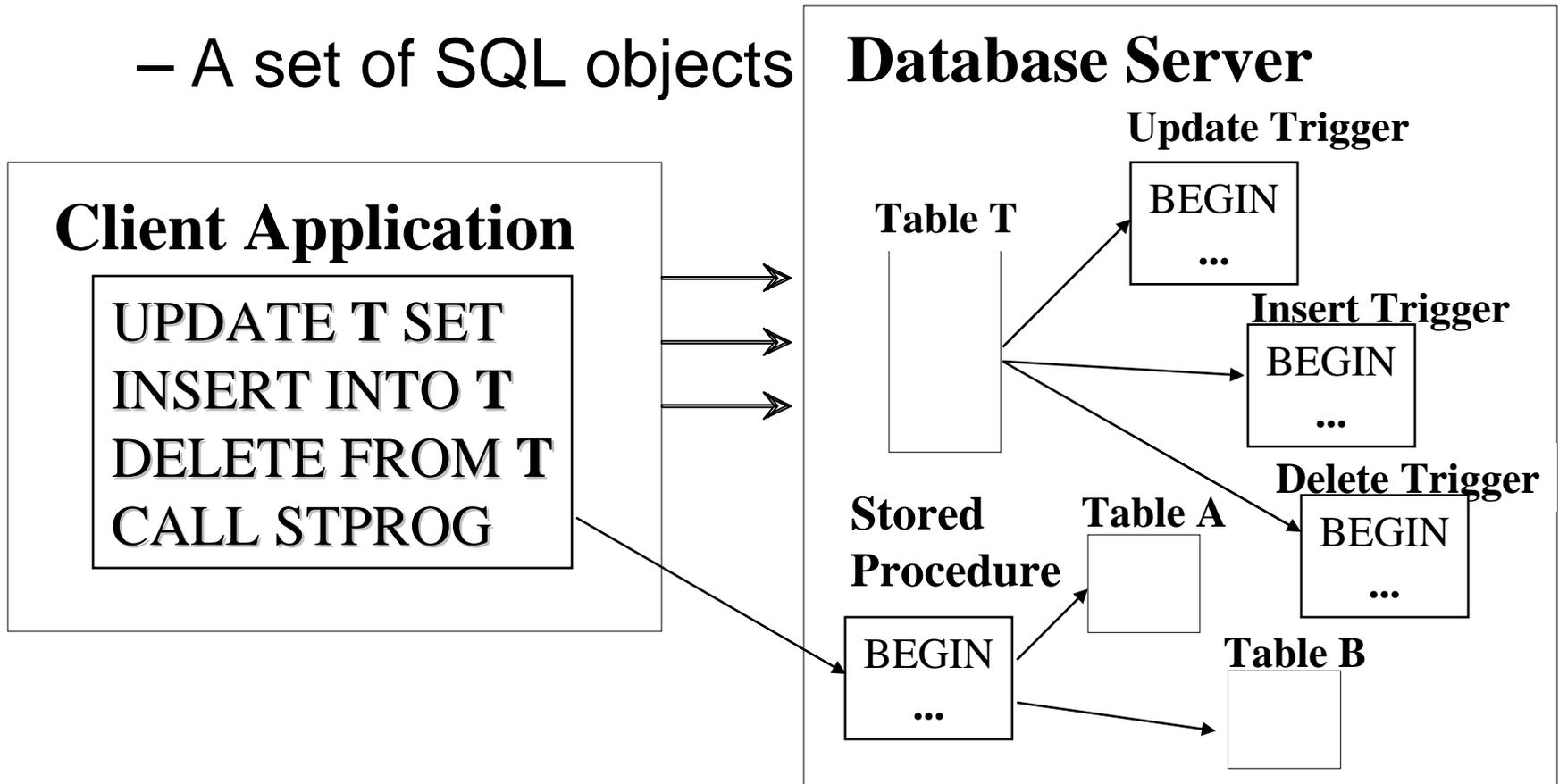
The Relational Objects

- Location



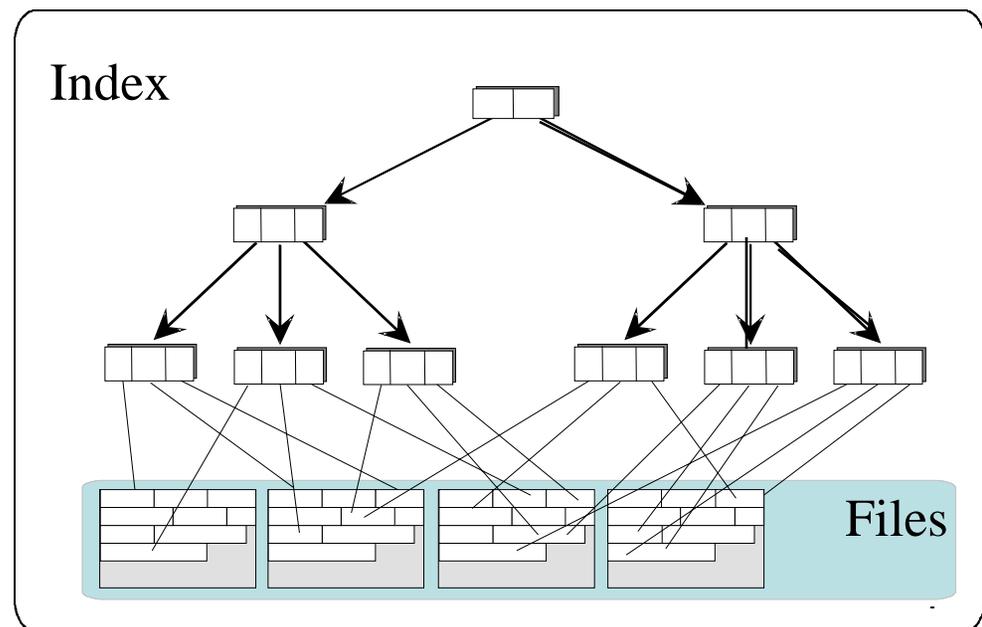
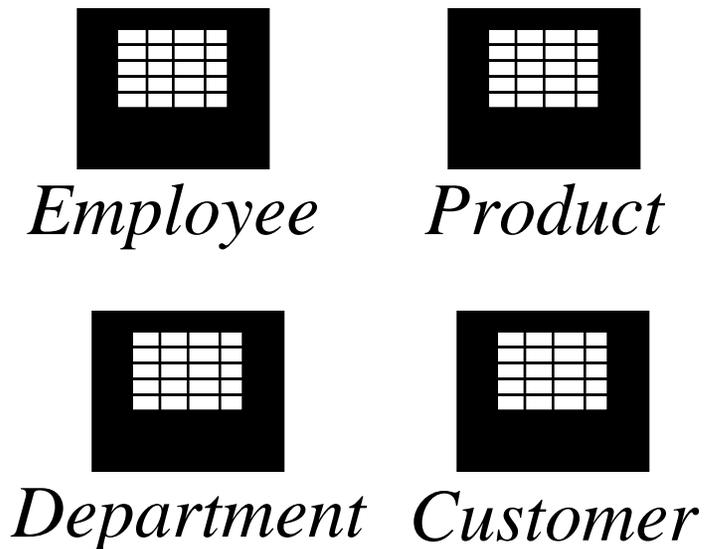
The Relational Objects...

- Database
 - A set of SQL objects



The Relational Objects...

- Database
 - A collection of tables and associated indexes



The Relational Objects...

- Relation
 - A named, two dimensional table of data
- Database
 - A collection of databases, tables and related objects organised in a structured fashion.
 - Several database vendors use **schema** interchangeably with **database**

Relational Objects...

Data is presented to the user as tables:

- ☞ Tables are comprised of **rows** and a fixed number of named **columns**.

Table

	Column 1	Column 2	Column 3	Column 4
Row				
Row				
Row				

Relational Objects...

Data is presented to the user as tables:

- ☞ Columns are attributes describing an entity.
Each column must have an unique name and a data type.

Employee

	Name	Designation	Department
Row			
Row			
Row			

Structure of a relation (e.g. Employee)

Employee(Name, Designation, Department) 12

Relational Objects...

Data is presented to the user as tables:

- ☞ Rows are records that present information about a particular entity occurrence

Employee

	Name	Designation	Department
Row	De Silva	Manager	Personnel
Row	Perera	Secretary	Personnel
Row	Dias	Manager	Sales

Relational model terminology

- Row is called a 'tuple'
- Column header is called an 'attribute'
- Table is called a 'relation'
- The data type describing the type of values that can appear in each column is called a 'domain'
- Eg:- Names : the set of names of persons

Employee_ages : value between 15 & 80 years old

The above is called 'logical definitions of domains'.

A data type or format can also be specified for each domain.

Eg: The employee age is an integer between 15 and 80

Characteristics of relations



- Ordering of tuples
 - Tuples in a relation don't have any particular order. However in a file they may be physically ordered based on a criteria, this is not there in relational model
- Ordering of values within tuple
 - Ordering of values within a tuple are unnecessary, hence a tuple can be considered as a 'set'.
 - But when relation is implemented as a file attributes may be physically ordered
- Values in a tuple are atomic

Relational constraints



- **Domain constraints**

- specifies that the value of each attribute 'A' must be an atomic value. And from the specified domain

- **Key constraints**

- There is a sub set of attributes of a relational schema with the property that no two tuples should have the same combination of values for the attributes.
- Any such subset of attributes is called a 'superkey'
- A 'superkey' can have redundant attributes. A **key** is a *minimal* superkey
- If a relation has more than one key, they are called *candidate keys*
- One of them is chosen as the *primary key*